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The Modern Construction Solutions

#1059, MIG-A Sector, Opp. Railwheel Factory,
Yelahanka New Town, Bangalore - 64
Ph : 8048505503 | Email : aartnassociates@gmail.com

Test Report of Fine Aggregate

IS: 383-2016, IS: 2386 (Part-1, 3)-1963 (Reaffirmed 2012)	Date:	23-11-2020

Name of Work : Providing and Fixing LED Lights at Yelahanka Division

Client	Bruhat Bengalore Mahanagara Palike (BBMP) , Yelahanka Zone, Bengaluru.
Contractor	Sri. Madhusudhan A N
Customer Reference	EE(PROJECT)/YNK ZONE/WO/89/2020-21
Source of Sample	Sample supplied by Agency
Sample Condition	Satisfactory
Sample Type	Coarse Aggregate
Date of Test	23-11-2020

Physical Properties

Sl. No	Physical Properties	Result	Requirements as per IS: 386-2016
1	Flakines Index (%)	13.20	Combined Flakiness and Elongation Index ahall nor exceed 40% for uncrushed and crushed aggregate
2	Elongation Index (%)	12.6	
3	Specific Gravity	2.66	-
4	Bulk Density (Loose) (Kg/l)	1.54	-
5	Bulk Density (Composed) (Kg/l)	1.58	-
6	Water Absorption (%)	0.22	-
7	Aggregate Crushing Value (%)	24.50	Max 30% for Aggregates to be used in concrete for wearing surfaces, In case aggregate Crushing Value exceeds 30% then the test for 10% fines should be conducted for aggregate to be used in concrete oter tha for wearing surfaces
8	Aggregate Impact Value (%)	22.80	Max 30% for aggregate to be used in concrete for wearing surfaces, 45% for aggregate to be used in concrete other than for wearing surface.

Remarks :

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Test Report of Fine Aggregate

IS: 383-2016, IS: 2386 (Part-1, 3)-1963 (Reaffirmed-2012)	Date: 23-11-2020

Name of Work : Providing and Fixing LED Lights at Yelahanka Division

Client	Bruhat Bengalore Mahanagara Palike (BBMP) , Yelahanka Zone, Bengaluru.
Contractor	Sri. Madhusudhan A N
Customer Reference	EE(PROJECT)/YNK ZONE/WO/89/2020-21
Source of Sample	Sample supplied by Agency
Sample Condition	Satisfactory
Sample Type	Coarse Aggregate
Date of Test	23-11-2020

Physical Properties

Sl. No	Physical Properties	Result	Requirements as per IS: 386-2016
1	Flakines Index (%)	12.40	Combined Flakiness and Elongation Index ahall nor exceed 40% for uncrushed and crushed aggregate
2	Elongation Index (%)	11.8	
3	Specific Gravity	2.68	-
4	Bulk Density (Loose) (Kg/l)	1.48	-
5	Bulk Density (Composed) (Kg/l)	1.52	-
6	Water Absorption (%)	0.22	-

Remarks :

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Test Result of Grain Size Analysis

(IS : 2720 Part -4) Date: 09-12-2020

Name of Work : Providing and Fixing LED Lights at Yelahanka Division

Client	Bruhat Bengalore Mahanagara Palike (BBMP) , Yelahanka Zone, Bengaluru.
Contractor	Sri.Madhusudhan A N (Suraksha Electticals)
Customer Refe	EE(PROJECT)/YNK ZONE/WO/89/2020-21
Source of Sam	Sample supplied by Agency
Sample Type	Soil-Grain Size Analysis
Date of Test	09-12-2020

Weight before wash (gm) : 1000 Weight after wash (gm) :

IS Sieve Size (mm)	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative (%) of Retained (gm)	Cumulative (%) of Passing (gm)	Remarks
75 mm	0	0	0	100	
20 mm	0	0	0	100	
4.75 mm	6.7	6.7	0.67	99.33	
2 mm	119.54	126.24	12.62	87.38	
425 m	204.5	330.74	33.07	66.93	
75 m	185.54	516.28	51.63	48.37	
Pan					
TOTAL					

OBSERVATION SHEET

DESCRIPTION PARTICAL		SIEVE SIZE	PERCENTAGE	Total %
Gravel	Coarse	75 mm - 20 mm	0.00	0.67
	Fine	20 mm - 4.75 mm	0.67	
Sand	Coarse	4.75 mm - 2 mm	11.95	50.96
	Medium	2 mm - 0.425 mm	13.23	
	Fine	0.425 mm - 0.075 mm	28.25	
Silt & Clay		0.075 mm Passing	48.37	48.37

Remarks :

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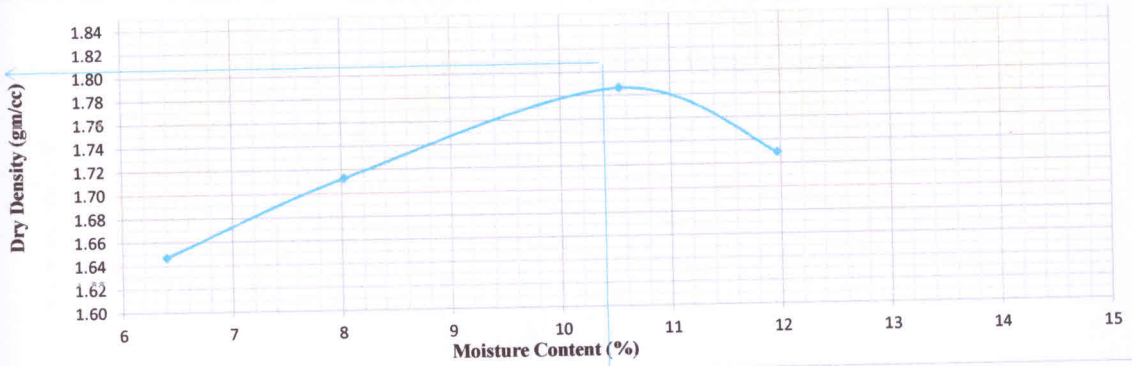
Test Result of Moisture - Density Relationship

(IS : 2720 , Part-08) — Date: 09-12-2020

Name of Work : Providing and Fixing LED Lights at Yelahanka Division

Client	Bruhat Bengalore Mahanagara Palike (BBMP) , Yelahanka Zone, Bengaluru.				
Contractor	Sri.Madhusudhan A N (Suraksha Electticals)				
Customer Reference	EE(PROJECT)/YNK ZONE/WO/89/2020-21				
Source of Sample	Sample supplied by Agency				
Sample Type	Soil-Moisture - Density Relationship				
Date of Test	09-12-2020				
Region no :	Wt. Sample Taken :		5 Kg		
Determination No	1	2	3	4	
Percentage of Water taken(%)	6	8	10	12	
Mould No.	3	3	3	3	
Volume of mould (V) CC	2250.63	2250.63	2250.63	2250.63	
Mass of mould (M1) gm	5740	5740	5740	5740	
Mass of mould+Compacted soil (M2) gm	9684	9904	10184	10098	
Mass of Compacted soil(M3=M2-M1) gm	3944	4164	4444	4358	
Wet Density of soil (γ_w)=M3/V gm/cc	1.752	1.850	1.975	1.936	
Container No.	S125	S126	S127	S128	
Mass of Container (gm)	32.72	30.89	32.23	30.30	
Mass of Wet Soil+Container (gm)	105.23	109.55	111.24	120.21	
Mass of Oven Dry Soil + Container (gm)	100.87	103.71	103.71	110.6	
Mass of Water (gm)	4.36	5.84	7.53	9.61	
Weight of dry soil (gm)	68.15	72.82	71.48	80.30	
Water Content (%)	6.40	8.02	10.53	11.97	
Dry Density of Soil (γ_d)=γ_w/(1+w%) gm/cc	1.647	1.713	1.786	1.729	



Remarks :

From Graph		
Maximum Dry Density (MDD)	1.785	gm/cc
Optimum Moisture Content (OMC)	10.40	%

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Test Result of Atterberg Limits

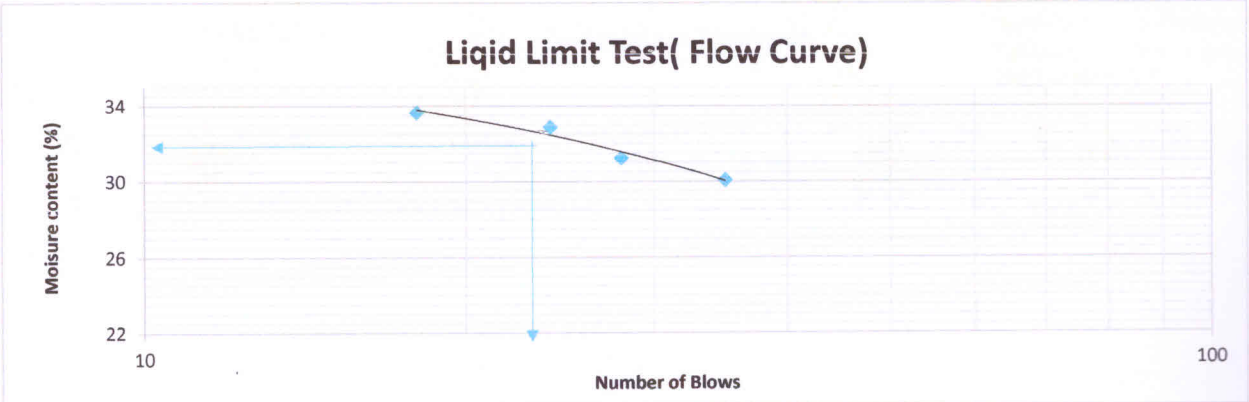
(IS : 2720, Part - 5) | Date: 09-12-2020

Name of Work : Providing and Fixing LED Lights at Yelahanka Division

Client	Bruhat Bengalore Mahanagara Palike (BBMP) , Yelahanka Zone, Bengaluru.
Contractor	Sri.Madhusudhan A N (Suraksha Electticals)
Customer Reference	EE(PROJECT)/YNK ZONE/WO/89/2020-21
Source of Sample	Sample supplied by Agency
Sample Type	Soil-Atterberg Limits
Date of Test	09-12-2020

	Determination No.	Liquid Limit				Plastic Limit	
		1	2	3	4	1	2
1	No Of Blows	18	24	28	35		
2	Container No.	S119	S120	S121	S122	S123	S124
3	Mass of Container (gm)	30.07	32.39	31.73	31.57	30.58	31.79
4	Mass of Wet Soil + Container (gm)	56.87	57.04	55.17	56.96	43.94	41.14
5	Mass of oven Dry Soil + Container (gm)	50.12	50.94	49.59	51.09	42.34	40.09
6	Mass of Water=(4-5)	6.75	6.10	5.58	5.87	1.60	1.05
7	Mass of oven dry soil =(5-3)	20.05	18.55	17.86	19.52	11.76	8.30
8	Water Content (w=6/7*100)	33.67	32.88	31.24	30.07	13.61	12.65

Liqid Limit Test(Flow Curve)



Liquid Limit : Moisture Content at 25 Blows

Liquid Limit	32.24	%
Plastic Limit	13.13	%
Plasticity Index	19.11	%

Remarks :

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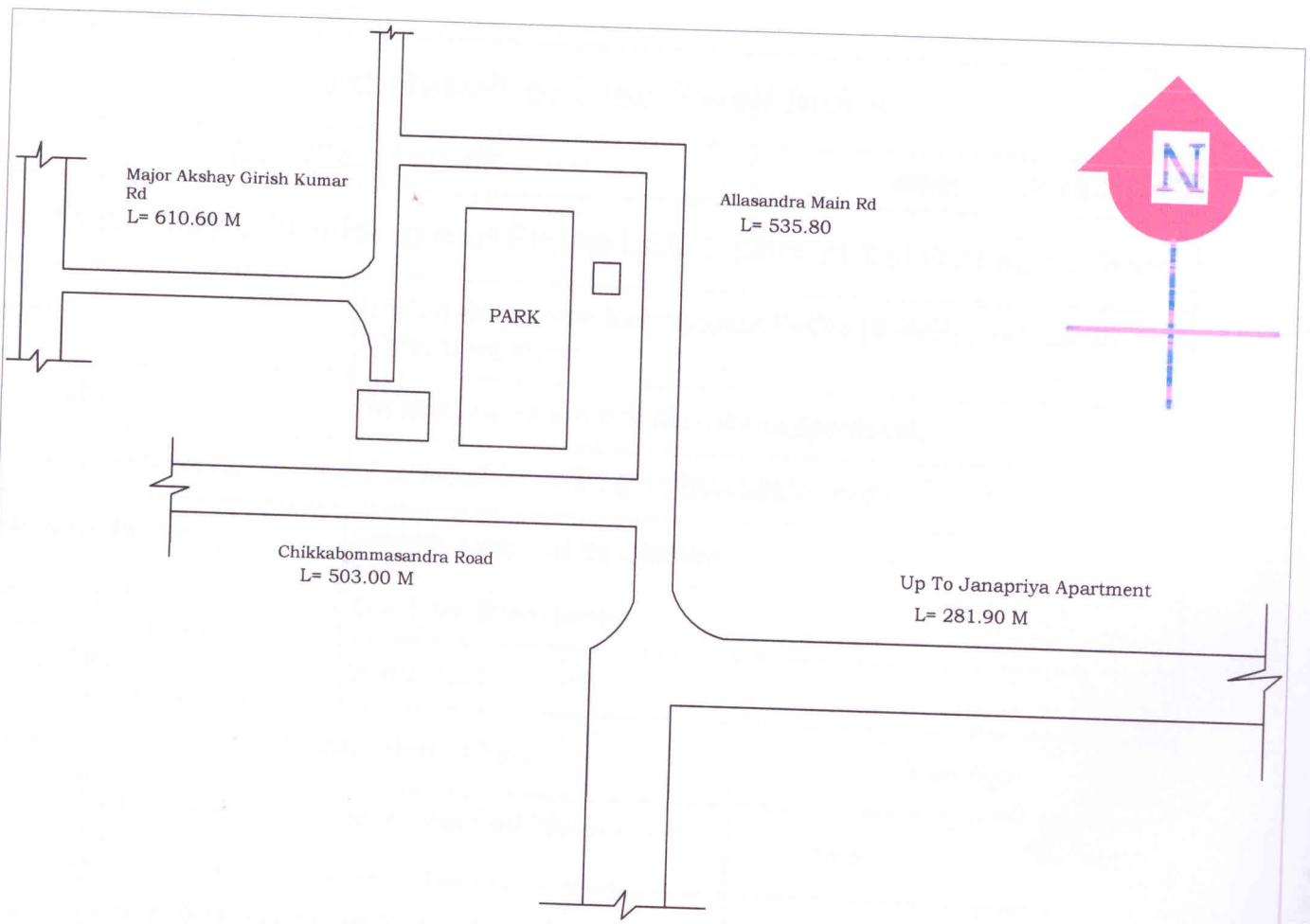

Aartn Associates

Assistant Engineer

Assistant Executive Engineer
Yelahanka Sub Division
Bangalore-64

CLIENT: BRUHAT BANGALORE MAHANAGARA PALIKE	CONSULTANT:- AARTN ASSOCIATES	PROJECT:- CONSULTANCY SERVICES FOR PROJECT MANAGEMENT CONSULTANCY FOR THE WORK OF PROVIDING AND FIXING LED LIGHTS AT YELAHANKA DIVISION	Prepared by / Designed by / Checked by / Reviewed by / Date	TITLE: Detailed for providing and Fixing LED Lights at Yelahanka Division; GO.B1No.; SCALE: NTS

Revisions		
Rev.	Date	Description
R0		

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The Modern Construction Solutions

#1059, MIG-A Sector, Opp. Railwheel Factory,
Yelahanka New Town, Bangalore - 64
Ph : 8048505503 | Email : aartnassociates@gmail.com

Test Result of Free Swell Index

(IS : 2720 , Part-40) — Date: 09-12-2020

Name of Work : Providing and Fixing LED Lights at Yelahanka Division

Client	Bruhat Bengalore Mahanagara Palike (BBMP) , Yelahanka Zone, Bengaluru.
Contractor	Sri.Madhusudhan A N (Suraksha Electticals)
Customer Reference	EE(PROJECT)/YNK ZONE/WO/89/2020-21
Source of Sample	Sample supplied by Agency
Sample Type	Soil-Free Swell Index
Date of Test	09-12-2020

S.No.	Description of Test	Readings	
1	Vol. of Soil Specimen in Distilled Water in cc (Vd)	11.8	12.1
2	Vol. of Soil Specimen in Kerosene in cc (Vk)	10	10
3	Free Swell Index in Percentage ((Vd - Vk) / Vk) x 100	18.00	21.00
	AVG (%)	19.50	

Note :

1. Take 10gm of each sample.

Remarks :

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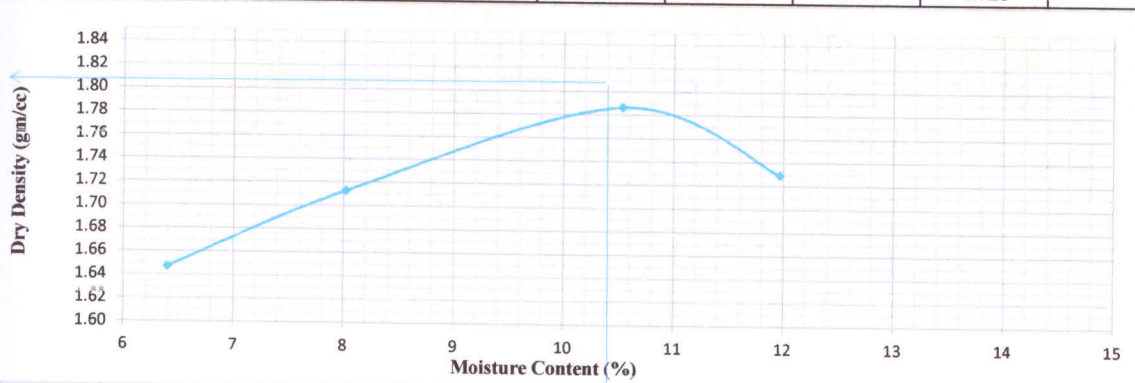
Test Result of Moisture - Density Relationship

(IS : 2720 , Part-08) | Date: 09-12-2020

Name of Work : Providing and Fixing LED Lights at Yelahanka Division

Client	Bruhat Bengalore Mahanagara Palike (BBMP) , Yelahanka Zone, Bengaluru.				
Contractor	Sri.Madhusudhan A N (Suraksha Electticals)				
Customer Reference	EE(PROJECT)/YNK ZONE/WO/89/2020-21				
Source of Sample	Sample supplied by Agency				
Sample Type	Soil-Moisture - Density Relationship				
Date of Test	09-12-2020				
Region no :	Wt. Sample Taken : 5 Kg				
Determination No	1	2	3	4	
Percentage of Water taken(%)	6	8	10	12	
Mould No.	3	3	3	3	
Volume of mould (V) CC	2250.63	2250.63	2250.63	2250.63	
Mass of mould (M1) gm	5740	5740	5740	5740	
Mass of mould+Compacted soil (M2) gm	9684	9904	10184	10098	
Mass of Compacted soil(M3=M2-M1) gm	3944	4164	4444	4358	
Wet Density of soil (γ_w)=M3/V gm/cc	1.752	1.850	1.975	1.936	
Container No.	S125	S126	S127	S128	
Mass of Container (gm)	32.72	30.89	32.23	30.30	
Mass of Wet Soil+Container (gm)	105.23	109.55	111.24	120.21	
Mass of Oven Dry Soil + Container (gm)	100.87	103.71	103.71	110.6	
Mass of Water (gm)	4.36	5.84	7.53	9.61	
Weight of dry soil (gm)	68.15	72.82	71.48	80.30	
Water Content (%)	6.40	8.02	10.53	11.97	
Dry Density of Soil (γ_d)=γ_w/(1+w%) gm/cc	1.647	1.713	1.786	1.729	



Remarks :

From Graph		
Maximum Dry Density (MDD)	1.785	gm/cc
Optimum Moisture Content (OMC)	10.40	%

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Test Result of Field Density Test

IS:2720 (Part-28) | Date: 09-12-2020

Name of Work : Providing and Fixing LED Lights at Yelahanka Division

Client		Bruhat Bengalore Mahanagara Palike (BBMP) , Yelahanka Zone, Bengaluru.					
Contractor		Sri.Madhusudhan A N (Suraksha Electticals)					
Customer Reference		EE(PROJECT)/YNK ZONE/WO/89/2020-21					
Source of Sample		Sample supplied by Agency					
Sample Type		Soil Field Density Test (FDD)					
Date of Test		44174					
MDD (gm/cc)		1.785					
OMC (%)		10.4					
Field Density		Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
Weight of soil from hole (Ww)	gm	11201	11326	11881	11686	11771	11621
Weight of Sand + Cylinder (W1)	gm	30000	30000	30000	30000	30000	30000
Weight of Sand + Cylinder after pouring	gm	19499	19414	19109	19149	19174	19284
Weight of Sand in Cone (W3)	gm	2257	2257	2257	2257	2257	2257
Weight of Sand in hole (W_b)	gm	8244	8329	8634	8594	8569	8459
Unit Weight of Sand (Gs)	gm/cc	1.321	1.321	1.321	1.321	1.321	1.321
Volume of the hole (v)=Wb/Gs	cc	6240.73	6305.07	6535.96	6505.68	6486.75	6403.48
Bulk Density of Soil ´Y = Ww / v	gm/cc	1.79	1.80	1.82	1.80	1.81	1.81
Moisture content by RMM	%	10.5	9.66	10.4	9.66	10.7	10.4
Dry density of soil ´Y_d = {g /(1 + w / 100	gm/cc	1.62	1.64	1.65	1.64	1.64	1.64
Relative Compaction	%	0.9100	0.9177	0.9224	0.9177	0.9183	0.9209
% of Compaction required	%	0.918					

Remarks:

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Test Result of Field Density Test

IS:2720 (Part-28) | Date: 09-12-2020

Name of Work : Providing and Fixing LED Lights at Yelahanka Division

Client		Bruhat Bengalore Mahanagara Palike (BBMP) , Yelahanka Zone, Bengaluru.					
Contractor		Sri.Madhusudhan A N (Suraksha Electticals)					
Customer Reference		EE(PROJECT)/YNK ZONE/WO/89/2020-21					
Source of Sample		Sample supplied by Agency					
Sample Type		Soil Field Density Test (FDD)					
Date of Test		09-12-2020					
MDD (gm/cc)		1.785					
OMC (%)		10.4					
Field Density		Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
Weight of soil from hole (Ww)	gm	11156	11281	11836	11641	11726	11576
Weight of Sand + Cylinder (W1)	gm	30000	30000	30000	30000	30000	30000
Weight of Sand + Cylinder after pouring	gm	19452	19367	19062	19102	19127	19237
Weight of Sand in Cone (W3)	gm	2257	2257	2257	2257	2257	2257
Weight of Sand in hole (W_b)	gm	8291	8376	8681	8641	8616	8506
Unit Weight of Sand (Gs)	gm/cc	1.321	1.321	1.321	1.321	1.321	1.321
Volume of the hole (v)=Wb/Gs	cc	6276.31	6340.65	6571.54	6541.26	6522.33	6439.06
Bulk Density of Soil ´Y = Ww / v	gm/cc	1.78	1.78	1.80	1.78	1.80	1.80
Moisture content by RMM	%	10.2	9.8	10.6	10.2	10.5	10.8
Dry density of soil ´Y_d = {g /(1 + w / 100	gm/cc	1.61	1.62	1.63	1.61	1.63	1.62
Relative Compaction	%	0.9036	0.9078	0.9123	0.9047	0.9115	0.9090
% of Compaction required	%	0.908					

Remarks:

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Test Result of Field Density Test

IS:2720 (Part-28) | Date: 09-12-2020

Name of Work : Providing and Fixing LED Lights at Yelahanka Division

Client		Bruhat Bengalore Mahanagara Palike (BBMP) , Yelahanka Zone, Bengaluru.					
Contractor		Sri.Madhusudhan A N (Suraksha Electticals)					
Customer Reference		EE(PROJECT)/YNK ZONE/WO/89/2020-21					
Source of Sample		Sample supplied by Agency					
Sample Type		Soil Field Density Test (FDD)					
Date of Test		09-12-2020					
MDD (gm/cc)		1.785					
OMC (%)		10.4					
Field Density		Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
Weight of soil from hole (Ww)	gm	11211	11336	11891	11696	11781	11631
Weight of Sand + Cylinder (W1)	gm	30000	30000	30000	30000	30000	30000
Weight of Sand + Cylinder after pouring	gm	19521	19436	19131	19171	19196	19306
Weight of Sand in Cone (W3)	gm	2257	2257	2257	2257	2257	2257
Weight of Sand in hole (W_b)	gm	8222	8307	8612	8572	8547	8437
Unit Weight of Sand (Gs)	gm/cc	1.321	1.321	1.321	1.321	1.321	1.321
Volume of the hole (v)=Wb/Gs	cc	6224.07	6288.42	6519.30	6489.02	6470.10	6386.83
Bulk Density of Soil $\gamma = Ww / v$	gm/cc	1.80	1.80	1.82	1.80	1.82	1.82
Moisture content by RMM	%	10.5	9.66	10.4	10	10.73	10.7
Dry density of soil $\gamma_d = \{g / (1 + w / 100$	gm/cc	1.63	1.64	1.65	1.64	1.64	1.65
Relative Compaction	%	0.9132	0.9209	0.9256	0.9180	0.9212	0.9216
% of Compaction required	%	0.920					

Remarks:

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EE (Project) Ynk Zone/Wo/89/2020-21 **Date: 04-02-2021**

1. TEST REPORT ON REINFORCEMENT STEEL:

Sub: Testing of Reinforcement Steel of diameter 8, and 12 mm **TMT Steel.**
{Project*: Providing and Fixing LED Lights at Yelahanka Division

P3748 Under Chief Minister Nava Nagarothana grants **Ref.**: Material Testing/PMC/20-21,

Report Required for: Assistant Executive Engineer,
Yelahanka Project Division,
BBMP, Bangalore.
Name of the Agency/Contractor*: M/s Suraksha Electricals, Prop: Sri.Madhsudhan.

TABLE – 1

SL No	Details	For 8 mm		For 12 mm	
		Test Results	Test Results	Test Results	Min Req. as per IS 1786-2008
01	Observed diameter of bar	**12.0 mm**	**12.0 mm**	**10.0 mm**	10.0 mm
02	Observed Wt/m Length **Kg/m**	**0.892**	**0.892**	**0.621**	0.567
03	Proof stress/Yield stress, fy , **N/mm²**	**554.0**	**554.0**	**556.0**	500.0
04	Bend/ Re bend Test	**Ok**	**Ok**	**Ok**	---
05	Percentage of Elongation, %	**21.50**	**21.50**	**20.80**	16.00
06	Ultimate Tensile Strength **N/mm²**	**639.0**	**639.0**	**645.0**	565.0

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Type Test Report

Name of Manufacturer / Brand / Responsible Vendor/ Trade Mark : HAVELLS
Type of Product : LED Luminaires for Road and Street Lighting
Product Model : Endura Pearl Magnum 120W **Date 18.10.2020**
Product Description :ENDURAPEARLPLUSSL120WLED757PASYTOPC
Tests conducted as per : IS 10322 (PART 5/SEC 3) : 2012
Ratings :240V~, 50Hz, 120W, 540mA, Power factor ≥ 0.95, THD ≤ 10%
:Class I, IP66, IK07, Ta : -10 °C.....+50 °C, Outdoor Application
LED Driver Used :Built-in Led Driver

Sr. No.	Test Requirements	Clause Reference	Test Requirement	Results / Remarks	Verdict
1	General Test Requirements	Clause 4 (1)			
		4 (1.1)	Information for Luminaire Design Considered	YES	P
		4 (1.3)	More sections applicable	No	P
2	Classification of Luminaires	Clause 5 (2)			
		5 (2.2)	Type of protection	Class I	P
		5 (2.3)	Degree of protection	IP66	P
		5 (2.4)	Luminaire suitable for mounting on normally flammable surfaces	YES	P
			Luminaire suitable for mounting on normally Non Combustible materials	NO	P
		5 (2.5)	Luminaire for normal Use	YES	P
			Luminaire for Rough Service	NO	P
3	Marking	Clause 6 (3)			
		6 (3.2)	Mandatory Marking	Complied	P
			Position of the marking Format of Symbol / Text	Complied	P
		6 (3.3)	Additional Information		
			Nominal Frequency, Symbol of supply,	50Hz, 240V ~	P
			Operation Temperature,	Ta : -10 °C.....+50 °C	P
			Power factor and Supply Current	Power factor ≥ 0.95, 540 mA	P
			Rough Service Luminaire	No	N/A
		6 (3.4)	Test With Water, Test With Hexane, Legible	Complied	P
4	Construction	Clause 7 (4)			
		7 (4.2)	Components Replaceable without difficulty	Complied	P
		7 (4.3)	Wire ways smooth and free from sharp edges	Satisfactory	P
		7 (4.7)	Terminal and supply connections	Satisfactory	P
5	Creepage distances and clearance	Clause 8 (11)	Creepage distances and clearance	Satisfactory	P
6	Provision for earthing	Clause 9 (7)			
		9 (7.2.1 + 7.2.3)	Accessible metal parts : Resistance < 0.5 ohm Clause	Satisfactory	P
7	Screw Terminals	10 (14)	Screw terminals	Satisfactory	P
8	Screwless Terminals	Clause 10 (15)	Screwless terminals and electrical connections	Satisfactory	P
9	External and internal wiring	Clause 11 (5)	Means of Connection, Suitable size and Type of Cable, Type of Attachment, Cord Encourage,	Satisfactory	P
10	Protection against electric shock	Clause 12 (8)	Live parts not accessible	Satisfactory	P
11	Endurace tests and thermal tests	Clause 13 (12)	After endurance test: No parts unserviceable, Luminaire not unsafe, No cracks/ deformation, marking legible, Limiting temperatures at 25 °C Internal / External wiring - 90 °C Driver Tc - 100 °C Diffuser/ Lens - 90 °C Supply terminal - 80 °C Cable Gland - 90 °C SPD Encloser - 125°C LED Module Tp < 80 °C	Satisfactory	P
12	Resistance to dust and moisture	Clause 14 (9)	Classification according to IP	IP 66	P
		14 (9.2)	No Contact with Live Parts (IP 2X) No entry into enclosure (IP 3X & IP 4X) No Contact with Live Parts (IP 3X & IP 4X)		N/A
			No deposit in Dust Proof Luminaire (5X)		N/A
			No telcom in dust tight luminaire (6X)	Satisfactory	P
			No trace of water on current carrying parts or on insulation where it could become a hazard (X5)		N/A
			i) For Luminaires without drain holes - no water entry ii) For Luminaires with drain holes - no hazardous water entry No water in water tight Luminaire (X6)	Satisfactory	P
			Electric strength test afterwards (9.2.7)	Satisfactory	P
		14 (9.3)	Humidity Test 48h : No damage after humidity test carried at 28 °C and Rh between 91% ..95%.	Satisfactory	P
			Electric strength test afterwards (9.2.7)	Satisfactory	P

Type Test Report

Name of Manufacturer / Brand / Responsible Vendor/ Trade Mark : HAVELLS
Type of Product : LED Luminaires for Road and Street Lighting
Product Model : ENDURA PEARL PLUS 120W , BIS/CRS- R No. R-84000930 **Date 18.10.2020**
Product Description :ENDURAPEARLPLUSSL120WLED757PASYTOPC

Sr. No.	Test Requirements	Clause Reference	Test Requirement	Results / Remarks	Verdict
13	Insulation Resistance and electric strength		Insulation Resistance Test:		
		Clause 15 (10)	Between Live parts of different polarity	Satisfactory	P
		15 (10.2.1)	Between Live parts and mounting surface		
			Between Live parts and metal parts		
			Electric Strength Test:		
		15 (10.2.2)	Between Live parts of different polarity	Satisfactory	P
			Between Live parts and mounting surface		
			Between Live parts and metal parts		
		15 (10.3)	Touch current or protective conductor current (mA) Limit 1.0 mA	Satisfactory	P
14	Resistance to heat, fire and tracking	Clause 16 (13)	Ball pressure test (temperature 125 °C)	Satisfactory	P
		16 (13.2.1)	The diameter of the ball impression shall not exceed 2 mm		
		16 (13.3.1)	Needle flame test (10s)	Satisfactory	P
		16 (13.3.2)	Glow wire test ((temperature 650 °C)	Satisfactory	P
		16 (13.4.1)	Tracking test	Satisfactory	P
15	**Electrical parameters**				
	IS 16104: 2012	Clause 7	Output Voltage and current		
		7.1			
			Starting and connecting requirements	Satisfactory	P
			The output should be within 110% of its rated value within 2 s		
			Starting voltage < 140Volts.	110 V	P
		7.2	Voltage and Current During Operation		
			The output voltage shall not differ more than ±10% from the rated Voltage	Satisfactory	P
			The output Current shall not differ more than ±10% from the rated Voltage	Satisfactory	P
			Output Power	107.43	
	IS 16104: 2012	Clause 8	Total Circuit Power (input):< 120W+10%	119.64	P
	IS 16104: 2012	Clause 9	Circuit Power Factor (Input): ≥ 0.95	0.95	P
	IS 16104: 2012	Clause 10	Supply Current (Input) : < 0.540 A + 10%	0.525	P
	IS 16104: 2012	Clause 12	Operational Test for Abnormal Conditions		
		12.a	Open Circuit Protection: Control-gear shall be supplied with rated voltage for 1 h without LED Module. At the end of the test the LED Module is connected and shall operate normally	Satisfactory	P
		12. c	Short Circuit Protection: Control-gear is short-circuited for 1 h, or unless the protection device opens the circuit. At the end of the test and after restoration of a possible protection device the control-gear shall function normally	Satisfactory	P
			Over Voltage Protection	Satisfactory	P
			Driver loss	12.21	P
			Driver Efficiency : ≥ 85%	89.79%	P
	IEC 61000-3-2		Total Harmonic Distortion : ≤ 10%	8.12%	P
	IEC 61000-4-5		Surge Protection : 10KV with SPD	Satisfactory	P
	IES LM79: 2008		Lumen Output :16500 Lumen (Typ.)	16512	P
	IES LM79: 2008		Lumen efficacy : 135 Lm/W (Typ.)	138.02	P

Conclusion : Sample meets all relevant Requirements of IS (Part 5 / Sec 3): 2012
: Sample meets all relevant Requirements of IS 16104: 2012, IEC 61000-3-2, IEC 61000-4-5 & IES LM79: 2008

for Havells India Limited

Rachna Tomar
AM CRI Lighting

AARTI ASSOCIATES BANGALORE

CLASSIFICATION | PUBLIC

ENDURA PEARL PLUS 100 W / 120 W NDPD

New generation energy saving and environmental friendly long life LED street light made up of pressure die cast aluminium housing with high efficiency LEDs as lighting source and lens embedded PC cover having TOP Opening seperate driver compartment with IP66 protection and impact resistance of IK07.

IP66 IK07 F

IS 10322 (Part 5 / Sec3): 2012 R-84000930 www.bis.gov.in

IS 15885 (Part 2 / Sec 13) R-85000612 www.bis.gov.in

PRODUCT SPECIFICATIONS

Benefits

- Delivers excellent illumination
- Long life & photobiologically safe LEDs
- High performance electronic driver ensures zero maintenance
- No harmful UV & IR radiations
- Environment friendly as it does not contain Mercury
- Aesthetically designed pressure die-cast alluminium housing with top opening service cover with powder coated metallic grey finish
- Instant light with low running temperatures
- Operating temperature: -10 °C to + 50 °C
- Operating voltage range: 140 V - 270 V
- Average life $L_{70}B_{50}$: 50000 hours

Housing

Pressure die-cast aluminium alloy for housing (heat sink) for effective thermal management, sturdiness, excellent corrosion resistant, separate optical and control gear compartment.

Finish

Pure Polyester powder coated grey after phosphochromate treatment.

Optic

High efficiency polycarbonate UV stablized cover with integrated Lens to ensure Asymmetrical batwing light distribution (For detailed photometric data, Please refer LM79 report & IES files).

Light source

High efficiency long life LED module with SMD LED package mounted on MCPCB. Lumen efficacy of LED >140 lm/W.

Control gear

Built-in electronic driver with APFC, lower THD, Output Short/Open Circuit Protection, Surge Protection upto 10 kV with SPD, Over Voltage Protection & other safety test as per IS 15885 Part-2/Sec 13.

Mounting & Maintenance

Suitable for side entry, pole mounting with bracket arm OD 54 mm. Recommended mounting height with suitable inground reinforcement is 9-10 mtr.

Applications

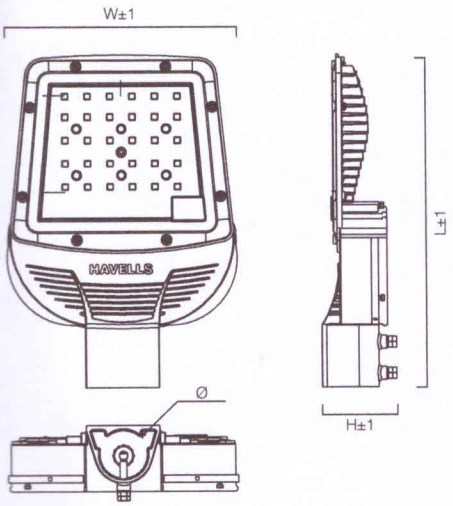
City road lighting
Shopping centers perimeter lighting
City lighting renovation
Urban landscaping

AARIN ASSOCIATES BANGALORE

TECHNICAL DATA

Product Description	System Power (W)	Nominal Voltage (V)	Mains Current (A)	Power Factor	THD (%)	Colour Temp. (CCT)	CRI (Ra)	System Lumens (lm)	Colour of Fixture	Weight (kg)
ENDURAPEARLPLUSSL100WLED757PASYTOPC	100 W	240 V	0.450 A	≥0.95	≤10	5700 K	≥70	13500 lm	Grey	3.5 kg
ENDURAPEARLPLUSSL120WLED757PASYTOPC	120 W	240 V	0.540 A	≥0.95	≤10	5700 K	≥70	16500 lm	Grey	3.5 kg

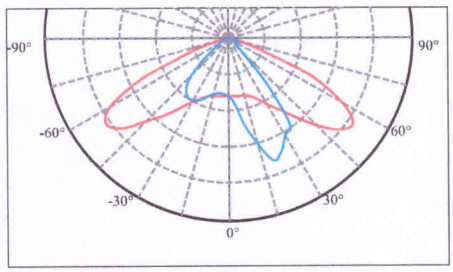
TECHNICAL DRAWING



DIMENSION

System Power	Length (l)	Width (w)	Height (h)	Mounting Hole Distance (D)
100 W / 120 W	368 mm	257 mm	83 mm	54 mm

All dimensions are in mm
Tolerance: ± 5 mm



Manufacturing tolerance applies as per relevant IS/IEC

Specifications are subject to change without prior notice due to continuous up-gradation of technology.

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